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INFORMATION REPORT INFORMATION REPORT

CENTRAL INTELLIGENCE AGENCY

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S-E-C-R-E-T

COUNTRY East Germany

REPORT

SUBJECT 1. Description of the Plate Cutting Machine Manufactured by VEB Werkzeugmaschinenfabrik Aschersleben
2. List of Products of the VEB Elektrokohle Berlin-Lichtenberg

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SOURCE EVALUATIONS ARE DEFINITIVE. APPRAISAL OF CONTENT IS TENTATIVE.

1. A technical description of the plate cutter, ST 10/2500/630, 1955 model, manufactured by the VEB Werkzeugmaschinenfabrik Aschersleben (17 pages)

2. A list of products of the VEB Elektrokohle (formerly Siemens-Plania) Berlin-Lichtenberg. Technical descriptions of the various products are included. (35 pages).

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STATE	X	ARMY	X	NAVY	X	AIR	X	FBI		AEC					
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(Note: Washington distribution indicated by "X"; Field distribution by "#".)

25X1

MANUFACTURING PROGRAM

Graphite and carbon electrodes

Carbon furnace linings,
completely worked for blast furnaces

Luting mass
for lining blast furnaces with carbon stones

Carbon stones
applicable as acid and lye proof lining material

Anode stones . Rammed layers

Sliding carbons
for electric railways, mine locomotives, cranes, and
trolley busses

Carbon brushes for all purposes

Pilot carbon brushes . Carbon brushes for motorcars
and clutch rings

Rectifier anodes . Powder metal and carbon bearing bushes

Carbon and graphite packing rings

Arc carbons . Spectral carbons . Battery cell carbons

Carbon tubes and graphite heating rods . Welding carbons

Silicon carbide heating rods and heating tubes

High ohmic resistances

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THE ADVANTAGES RESULTING FROM THE USE OF GRAPHITE ELECTRODES

1. The high conductivity of the electric graphite electrodes permits to provide a considerably smaller diameter as compared with electrodes of other type. In this way the user enjoys the following advantages:
 - reduction of the weight of the electrodes,
 - facilitated handling during transportation and assembly,
 - considerably smaller entrances in the cover of the furnace facilitate the tightening of these points,
 - considerably increased life of the furnace roof, due to the increased distances between electrodes.
2. Owing to the softness of the electric graphite the graphitized electrode, as contrasted with other electrode products, can be machined much easier and, for this reason, also more precisely. From this the following advantages result:
 - the homogeneity and precision of the cylindrical surface ensure a trouble-free transition of current from the socket to the electrode, thus avoiding the incidental formation of arcs at the transition points and, in this way, damages at the contact faces.
 - The fit between threaded nipple and box of the electrode joint can be made extraordinarily perfect, due to the good workability of the material so as to reduce the current losses at the transition points to a minimum.
 - The graphite electrodes have a good conductivity, and up to about 450°C they are free of remarkable oxidation.
 - The low contents of ashes of the electric graphite secure the execution of metallurgical work in highest precision and purity.
 - Fluctuations in temperature which incidentally may occur during the melting process, due to charging intervals etc., are of nearly no effect to graphite electrodes. There is no fear of destructions of the structure and of splintering-off of the electrodes resulting in undesired carburizing of the melt.

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Standard diameters, dia.-tolerances, standard lengths and weights of machined, cylindrical graphite electrodes:

Standard diameter		Dia.-tolerances	Standard lengths		Average unit weight in kgs *)
mm	inches		mm	inches	
50	2	± 0.3 mm	600-1000	$31\frac{1}{2}$ - $39\frac{1}{2}$	2.5 - 3.1
63	2 1/2				4.0 - 5.0
75	3				5.6 - 7.1
100	4		1200	47 1/4	15.1
			1500	59	18.9
120	4 3/4		1200	47 1/4	21.7
			1500	59	27.1
130	5 1/8	± 0.5 mm	1200	47 1/4	25.5
			1500	59	31.8
150	6		1500	59	42.4
180/175	7 1/8		1500/1500	59	61.0/58.0
200	8		1500	59	75.0
230/225	9 1/8		1500/1500	59	100.0/95.0
250/254	10		1500/1500	59	119.0/122.0
300/304	12		1500/1500	59	170.0/174.0
350/354	14	± 1.0 mm	1500/1500	59	231.0/237.0
400	16		1500	59	301.0
450/454	18		1500/1500	59	382.0/388.0
500	20		1500	59	470.0

*) Per electrode incl. nipple. The dimensions given in bold types are preferred especially in foreign countries.

All graphite electrodes are carefully tested, according to a special procedure and before leaving our works, as to their physical properties and, furthermore, as to the prescribed general characteristics of quality.

The electrodes have to excel in high breaking strength, resistivity against consumption, good electric conductivity, and, first of all, in extraordinary purity whereast the contents of ashes must amount to less than 0.5 %.

Characteristic figures:

Volume weight	above 1.55 gs/c.cm
Gravity	above 2.2 gs/c.cm
Volume of pores	below 30 %
Pressure strength	above 200 kgs/sq.cm
Bending strength	above 60 kgs/sq.cm
Thermal conductivity at 20°C	appr. 100 Kcal/mhr°C
Average specific heat for the range of temperature from 20 to 1300°C	from 0.2 to 0.4 Kcal/kg°C
Linear coefficient of expansion for the range of temperature from 20 to 1000°C	appr. $3 \cdot 10^{-6}$
Oxydation	perceivable above 600°C
Ashes	below 0.5 %

The individual load limits for the corresponding cross sections of the electrodes as well as for the current density are given in the following table in Amperes and Ampere/sq.cm respectively.

Diameter:	Cross section:	Standard load:	Standard current density
mm	sq.cm	appr. Amp.	appr. Amp./sq.cm
50	19.6	400 - 1000	20 - 50
63	31.2	550 - 1200	18 - 38
75	44.2	800 - 1500	18 - 31
100	78.5	1400 - 2100	18 - 25
120	113.0	1700 - 2900	15 - 26
130	132.7	2000 - 3500	15 - 26
150	176.6	2600 - 4200	15 - 22
175	240.4	3600 - 5300	15 - 20
180	254.3	3800 - 5600	15 - 21
200	314.0	4400 - 6600	14 - 20
225	397.4	5000 - 8500	13 - 20
230	415.3	5500 - 8800	13 - 20
250	490.6	6000 - 10000	12 - 20
300	706.5	8000 - 14000	11 - 19
350	961.6	9500 - 19500	10 - 18
400	1256.0	12500 - 22500	10 - 17
450	1389.6	16000 - 25000	10 - 15
500	1962.5	20000 - 30000	10 - 15

The specific resistance of the electrodes varies between

6 and 13 $\frac{\text{Ohms} \cdot \text{sq.mm}}{\text{m}}$

Technical Carbon
for the Manufacture of Aluminium

The quick development of the aluminium industry and the increasing use of aluminium alloys for technical purposes entailed, in course of the past decades of years, the development of various working procedures. All of them, however, presume the use of carbon anodes and cathodes. The electrolyser vessels consist of square, iron containers, the so-called tubs.

The tubs, serving as cathodes, are lined with a rammed layer or burnt bottom carbon. The anodes are suspended on a feed line.

The technical carbon used for anodes should be as poor in ashes as possible since the easier reducible components like silicic acid or iron oxide take soiling effect on the aluminium.

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The already experienced block method still uses burnt, amorphous carbon and consists of amorphous carbon. The head of the block is equipped with a threaded sunk hole so as to permit the casting in of the current feeding belts.

Technical terms:

:amret lasianhoet

mo. (kg) c. f. evous	Volume weight	above 1.5	gs/c.cm
mo. (kg) c. f. evous	Gravimetry	above 2.05	gs/c.cm
mo. (kg) c. f. evous	Volume of pores	below 27	%
mo. (kg) c. f. evous	Ashes	below 1	%
mo. (kg) c. f. evous	Specific resistance	below 65	Ohms sq.mm/m
mo. (kg) c. f. evous	Pressure strength	above 200	kgs/sq.cm

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with permanent working against the method Söderberg the tubes are mostly fed with burnt cathode blocks. These blocks, the so-called bottom plot carbons, bear slots on one narrow side which the current feeders are connected to.

Technical terms:

Technical terms

Volume weight above 1.5 gs/c.cm
 Gravity above 1.85 gs/c.cm
 Volume of pores below 20 %
 Specific resistance below 60 Ohms sq.mm/m
 Ashes below 5 %
 Pressure strength above 300 kgs/sq.cm

Anode Mass

Later manufacturing methods use a self-burning permanent electrode against Söderberg and that Söderberg electrodes with horizontal and vertical supply of current.

For such purposes we supply anode masses composed of pure cokes (petroleum or converted coke) with still uncoked pitch as binder. The compound begins to flow at temperatures of appr. 150°C.

Technical terms for the electrolysis of aluminum

Technical terms:	AM 32	AM 40
Maximum size of grain	3 mm	3 mm
Contents of ashes	below 1 %	above 0.9 %
Binding agent added	27 % + 2	30 % + 2
Specific resistance (burnt)	below 72 Ohms sq.mm/m	below 90 Ohms sq.mm/m
Pressure strength	above 160 kgs/sq.cm	above 200 kgs/sq.cm
Softening of the binder	70-75°C	70-75°C
Benzol solubles	24 %	27 %

Highly Refractory Carbon Stones

The advantages of technical carbon stones for lining purposes are:

Highly refractory materials are used for absorbing the effect of high temperatures. They must be of good resistivity against heavy mechanical and chemical stresses resulting from the high temperatures.

The advantages of carbon stones were especially utilized in the construction of blast furnaces. The high subliming point of carbon ranging at about 3800°C, the abrasion and scouring proofness, and the passive behaviour of this material against slag and pig iron have predestined it for its use for lining bottom, hearth and bushes of blast furnaces.

The only disadvantage is the sensitivity against oxygen.

Initial difficulties firstly told against the carbon stone.

It was proved, however, that such difficulties had to be traced back to defective designs. To-day the great majority of all blast furnaces are lined with carbon stones.

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Highly refractory lining mass for fastening the carbon stone lining.

Technical data:

Volume weight	above 1.5	gs/c.cm
Gravity	above 1.65	gs/c.cm
Volume of pores	below 22 %	
Contents of carbon	above 94 %	
Pressure strength	above 250	kg/sg.cm
Thermal conductivity at 100°C	3 to 6	Kcal/m h °C
Real specific heat at 100°C	appr. 0.2	cal/g . degree
Linear coefficient of expansion between 20 and 1000°C	from 4.3 . 10 ⁻⁶ up to 5.5 . 10 ⁻⁶	

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Summary

on the resistivity of carbon stones J K E
against various acids and aggressive solutions

Stressing chemical	Concentration % on stone	Temperature in °C	Resistivity
Flue gases, containing hydrofluoric acid	traces	60 to 100	resistant
Acetic aldehyde	100	20	resistant
Ammonia, aqueous	10 to 100	20 to 100	resistant
Waste mordant lye	20 to 100	20 to 100	resistant
Benzol	-	20	resistant
Bisulphite (of sodium) diluted	-	40	resistant
Bisulphite (of sodium) acidified	-	60 to 100	resistant
Bisulphite lye, acidified with SO ₂	acidified	50	resistant
Bleaching lye (sodium hypochloride)	12.5	20 to 60	yet resistant
Chlorine gas	-	20 to 100	resistant
Chromic acid	10 to 30	70 to 100	yet resistant
Acetic acid	10 to 100	20 to 100	resistant
Fluorides, neutral or alkaline	-	70	resistant
Hydrofluoric acid	up to 40	100	resistant
Formaldehyde solution	40	20	resistant
Potash lye	5 to 50	20 to 100	resistant
Fluosilicic acid	random	20	resistant
3-solution (Henkel)	-	70	resistant
Phosphoric acid	5 to 50	20 to 100	resistant
Gases from roasting, dry and damp	-	20	resistant
Nitric acid	5 to 30	20 to 100	resistant - not resistant
Nitric acid	concentrated	20 to 100	not resistant
Hydrochloric acid	5 to 15	20 to 100	resistant
Hydrochloric acid	concentrated	20 to 100	resistant
Sulphur dioxide, dry and moist	-	20 to 100	resistant
Sulphocarburet	-	20	resistant
Sulphuric acid	5 to 50	20 to 100	resistant
Sulphuric acid	concentrated	20 to 100	resistant
Sulphate or fresh sulphite liquor	-	20 to 100	yet resistant

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Tolerances for Plates and Rods:

Small type carbon brushes for

Dimensions up to 80 mm	=	$\pm 7\%$
Dimensions from 31 to 80 mm	=	$\pm 5\%$
Dimensions above 80 mm	=	$\pm 2.5\%$
Diameter up to 30 mm	=	$\pm 4\%$
Diameter from 31 to 113 mm	=	$\pm 2.5\%$

Deviations from the geometric axis

with lengths up to 500 mm	=	max. 0.7 % of total length
with lengths above 500 mm	=	max. 0.5 % of total length

The plates and rods are supplied in unmachined condition;
on request, they can be machined, against extra price, to
smaller tolerances.

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- Carbon contacts, carbon T-horns
attraction of vehicles.
Special bridges for the whole electric traction in the con-
tinuous load; measured under usual conditions;
graphite brushes giving best results of any kind.
- Graphite brushes

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Holder tolerances against brush

By the wear of the holding device the play within the holders, some times only that of some of them, is frequently enlarged beyond the admissible allowance. In such case all holders must be uniformly adjusted to a larger size, and new brushes have to be ordered for the changed nominal size. In the event of incidental remachining work attention should be naturally paid to plain and smooth guide faces within the holder box so as to prevent swinging and, therefore, unsmoothly running brushes. It is also necessary to round the upper and the lower edges of the contact faces so as to avoid any jamming or suspension of the brush (under formation of so-called saddles). The pressure finger or the pressure piece of the holder has to do nothing but to hold and to retain the brush in a fixed, constant position. Any effect taken by the pressure finger on the position of the brush is not allowed except the steady and reliable contact with the wall of the holder box. The working point of the pressure finger should be situated as far as possible in the center of the brush, and it should never change its position too much both with new and worn out brushes.

(- Vocabulary: -) Photo No. 10

- 1 - Holder; 2 - Maximum size; 3 - Minimum size;
- 4 - Tolerance; 5 - Nominal size;
- 6 - Range of tolerance; 7 - Nominal size, 1 or 2; 8 - 1)

Beating rings -
Beating rings -
Beating rings -

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of data relating to the material used in the manufacture of
Rectifier anodes made of technical carbon
 (type: 1000) (type: 1000)

The material E 376 H is used as anodes in rectifier tubes, thyratrons, transmitting valves etc. If the material is not used in shape of rotational solids plates dimensioned to

270 x 190 and pressed to special thicknesses are supplied.

In the event of orders for larger quantities paying the manufacture of a special press mould also stampings widely accommodated to finished sizes can be supplied.

As to rotational solids at present time the following dimensions are available:

Diameter	110	115	160	125	200	250	302 mm
Height	100	85	150	150	150	150	150 mm

In case larger quantities are ordered, also in this event special press devices can be made for the production of stampings with smallest over-allowances.

Diameter	110	115	160	125	200	250	302 mm
Height	100	85	150	150	150	150	150 mm

Diameter	110	115	160	125	200	250	302 mm
Height	100	85	150	150	150	150	150 mm

Physical and Chemical Data of Electric Graphite E 376 H

Property	Value
Volume weight	1.65 to 1.70
Real weight	above 2.15
Volume of pores	18 to 22%

Specific resistance: 15 to 25 Ohms sq.mm/m

Ash below 0.05 %, consisting of Si - Fe - Mn - Cu - Mg - Ca - Sulphur: below 0.04 %

Thermal conductivity: 35 to 40 Kcal/m.h.°C

Coefficient of thermal expansion: $15 \cdot 10^{-6}$ at 20 to 600°C

Bearing bushes of powder metal, suitable also to
emergency run (type: M596k)

Available production sizes:

Design No.	Inside diameter mm	Tolerance	Outside diameter mm	Tolerance	Length mm
---------------	-----------------------	-----------	------------------------	-----------	--------------

Technical bearings

25	12.5	H 8	16.1	r 6	15
4	12.5	H 8	16.5	r 6	18.5
12	12.5	H 8	19	r 6	16
5	14.2	H 8	19.1	r 6	16
10	15.86	H 8	19.15	r 6	18
3	16	H 7	22	r 6	22
15	16	H 7	22.8	r 6	22
9	16.15	H 7	12.25	r 6	15
24	16.2	H 8	19.38	r 6	15
6	18	H 7	24	r 6	26
20	18.2	H 7	21	r 6	20
17	19	H 7	22	r 6	20
13	21	H 7	25	r 6	26
16	22	H 7	25	r 6	20
11	25	H 7	32	r 6	26 & 3
18	30	H 7	37	r 6	18
19	42	H 7	66	r 6	25
22	44	H 7	74	r 6	24.5
21	48	H 7	88	r 6	10
20	50	H 7	90	r 6	14

Thermal conductivity: 35 to 40 kcal/m.h.⁰
Coefficient of thermal expansion: 10 to 15 at 20 to 200° C
Other dimensions on request.

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Carbon Packing Rings

Carbon packing rings are produced from the stuffing of the shafts of steam and water turbines. They are mostly composed of several segments, and that, on one hand, for facilitating the assembly, and, on the other hand, also for reasons of manufacture.

In order to achieve maximum stuffing effect, several rings are arranged one after another, and the joints are covered by ground-on overlaps.

Packing rings, in one piece or sectioned, are produced, however, for other purposes, too, e.g. for centrifugal pumps, piston pumps, compressors, paper mills, steam fittings etc.

Carbon materials are used, furthermore, also as piston rings in one or multi-stage compressors of special design.

The sizes of production range between smallest rings and such with outside diameters up to 900 mm. Larger rings, from 300 mm dia. upward, are available only sectioned, i.e. composed of several segments. The number of such segments depends on the size of the corresponding ring. Rings of 900 mm dia. f.i. are composed of twelve parts.

The materials used for packing rings are of types XSN and XSNW.

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Welding carbons

Dimensions

The welding carbons are available in diameters of 3 to 30 mm and in lengths of 440 mm.

Automation carbons can be evtl. supplied in lengths up to 700 mm.

Loadability

Type:

Diameter, mm

El. on otod

1942

1074

G

Amp.

Amp.

Amp.

6

40 to 50

50 to 75

75 to 100

8

50 to 75

75 to 100

100 to 150

10

75 to 100

100 to 150

150 to 200

12

100 to 125

150 to 200

200 to 250

14

125 to 150

200 to 250

250 to 300

16

150 to 200

250 to 300

300 to 400

18

200 to 250

300 to 350

400 to 500

20

250 to 300

350 to 400

500 to 600

Welding carbon plates

Cast iron of normal composition is welded according to the thermit procedure as well as according to the gas or arc welding method. Cast iron upon sufficient heating getting suddenly fluid the free welding places embanked. For such purposes the so-called welding carbon plates are used which are produced in various dimensions, with and without slot and spring; moreover, they can be conveniently machined by cutting, thus accommodating them to any shape of the casting. The plates are resistant against high temperatures.

Dimensions:

8 x 25 x 500 mm with and without slot and spring
 8 x 66 x 600 mm with slot and spring
 10 x 15 x 500 mm with and without slot and spring
 10 x 25 x 500 mm with and without slot and spring
 10 x 50 x 500 mm with and without slot and spring
 10 x 65 x 500 mm with and without slot and spring
 10 x 100 x 500 mm without slot and spring
 14 x 30 x 500 mm with and without slot and spring
 14 x 50 x 500 mm with and without slot and spring
 14 x 65 x 500 mm with slot and spring
 14 x 100 x 500 mm with slot and spring

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It became evident, however, that the carbon contact pieces are suitable to polish the trolley wire; in this way, upon the running-in of the exclusively used carbon contact pieces, there is not caused any wear of the trolley wire but only a small wear of the contact pieces amounting to about 0.5 mm per 1000 trolley-kms. 25X1

The module of elasticity of carbon amounting from 600 to 1200 kgs/sq.mm, furthermore, is a much more favourable one than that of copper (11000 kgs/sq.mm); the contact resistance and heat generation, therefore, are much lower than with copper, in spite of the high specific resistance of carbon. High-ohmic silicon carbide resistance in shape of rods, rings, and plates. for electric industrial and laboratory furnaces. generation of temperatures up to 1400°C. Silicon carbide heating rods and heating tubes for the

Carbon contact pieces are used for the following applications:

- a) Electric railway engines, tramways, mine and works railways, electric rail coaches, trolley busses etc.
- b) Lifting gears and cranes of any type.

The tolerance for the over and under-allowances of carbon contact pieces, when inserted into the holder, is ± 0.5 mm.

The carbon contact pieces can be produced as straight carbons or bent according to the desired radius in any length required.

The maximum of the electric specific resistance of carbon contact pieces ranges at 50 Ohms sq.mm/m.

The carbon contact pieces of profile No.5004 and 5044 are mostly furnished with sockets of galvanized sheet steel, that of profile No.5008 in most cases with sockets made of copper.

The dove-tail shaped part (socket fit) of high tension carbon contact pieces (e.g. for electric mine locomotives) is galvanically coppered in order to improve the current passage.

For lifting gears various types of contact pieces, partially with formed sheet steel sockets, are manufactured.

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(- Vokabularium: -)

(- Vokabularium: -)

1 - Table 2

Dimensions, resistance figures, and loadability
of ring and tube shaped resistances

2 - Item; 3 - Diameter; 4 - Length; 5 - Electric resistance;

outside inside
mms mms

mms

Ohms

+20%

+5% +5% +3%

6 - Continuous load;

Watts

100°C 200°C

- 55 -

(- Vokabularium: -)

1 - Table 3

(- Vokabularium: -)

Dimensions and resistance figures
of disk shaped silite resistances

2 - Item; 3 - Diameter; 4 - Height; 5 - Electric resistance

mms

mms

Ohms

+5%

+3%

6 - Test voltage²⁾ for the corresponding resistance figures;
Volts

7 - 1) Ring with bore of 18-mms diameter;

2) Test values true for short-time load only, due to
temperature dependence of the resistance.

Order Data

When placing the order, the following informations would
be appreciated:

1. Exact dimensions according to tables 1, 2, and 3.
2. Ohmic value and working voltage for which the resistance value should be available.
3. Value of load in Watts.
4. Indication of load: continuous or short-time load.
Time of load.

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Our box at the Leipzig Fair in spring of 1956:
On the ground of the Technical Fair,
hall 7, middle part (Electrotechnics)

Please come and see us also in this year at the same place
in the time from 3rd to 14th of March, 1957.

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TSE : 01

Plate Cutter, type ST/10/2500/630

No.: 927/a

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C o n t e n t s

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| 2. Rating and main data | No. 927, p.2 to 5 |
| 3. Working instructions | No. 927/a, p.6 to 7 |
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5 ST 1139, WN 5404 |
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| 10. Foundation plan | 2 ST 1005 |
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| 17. <u>Implements</u> | |
| 7 top and bottom cutters | 4 ST 1016 |
| 1 top cutter, to the right | 4 ST 1254 |
| 1 transverse bottom cutter | 4 ST 1289 |
| 1 transverse top cutter | 4 ST 1158 |

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Handwritten signature
(initials)

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ST 10/2500

Working Instructions

No. 927

for Plate Cutters, ST 10/2500
ST 16/3150
ST 25/3150

Page 2

Transport:

The machine is delivered in completely assembled condition. For facilitating the transport only the adjusting rail incl. gauge, the two rests, and the frontal adjusting rails were detached.
(At type ST 25/3150, moreover, the driving motor, coupling, and covering hood.)

Foundation:

The foundation drawing gives the minimum figures of the depth of foundation; the final depth, however, should be fixed according to the nature of ground on site.
The foundation must be hardened prior to the erection of the machine. The foundations screws shown in the foundations drawings are supplied on special order only.

Erection:

The erection of the machine may be gathered from the foundation plan. Prior to the erection anticorrosives and dirt should be carefully removed. The machine must be straightened and aligned in such a way that the table is in exact horizontal position both in transverse and longitudinal direction.
When assembling the cutter attention should be paid, furthermore, to the machine being most exactly aligned in all its parts, to an exactly closing run of the cutter slide in its track being achieved, and to a close contact of the slide to all guide surfaces.

After the correct assembly of the machine is carefully checked the compressed air line and the current supply are connected, and the machine is turned round once by hand. For this purpose the cover of the gear box is detached. By means of a spike then the flywheel with the engaged coupling can be easily turned round. The cutter slide should be moved down to its lowest position, and during this operation the uniform play of the cutters over the total length is examined.
Also in the lowest position of the cutter slide the contact of the rear slide faces of the guide with the cutter slide must be checked; that means that also in the lowest position of the slide all slide surfaces must show a close run.
After the machine is carefully aligned, undercast with cement, and the latter well hardened, the foundation screws are tightened. Some time after they are tested as to their tunking fit and retightened, if necessary. Prior to setting the machine to service it should be left to a no-load run for several hours during which time the lubrication should be observed.

Holding down appliance:

It is not necessary to adjust the holding down appliance for cutting thick and thin sheets. The gap between the straps of the holding down appliance and the table surface must be adjusted in such a manner that, in lowest position, the straps contact the table surface without compressing the conical springs.

Working Instructions

for Plate Cutters ST 10/2500

No. 927

ST 16/3150

Page 3

ST 25/3150

The cutter slide:

This device must always slide closely within the guide surfaces, wear of which may be balanced by readjusting the covers. If the cutting angle of the top cutter is to be reduced - e.g. for cutting thinner sheets - the left side of the cutter slide should be lifted, and that by turning the spindle by means of a spike. Prior to this work an attachment screw arranged at the upper spindle pin must be loosened. Upon finished readjustment this screw should be tightened again. The adjusted figure of the cutting angle can be read from the spindle.

The cutters:

They have to be kept always in sharp condition. When cutting thin plates they have to cut past closely to each other. The mutual adjustment of the cutters is done by displacing the holder of the bottom cutter by means of the 2 adjusting screws arranged at the sides. Prior to the adjustment the fastening screws of the bottom cutter holder must be loosened. Upon finished readjustment they must be firmly tightened again. Top and bottom cutter must be always adjusted in parallel. The play between the cutters depends on the thickness of the sheet 3 % of which it never should exceed.

The transverse cutters:

The transverse cutters are used for the seaming of longer sheets only. Separating the cuttings from the sheet plate after each cut they facilitate the displacement of the sheets in longitudinal direction of the cutters. The seam to be cut off must not be wider than the transverse cutters otherwise the rear front of the cutter would cut into the plain sheet and damage it.

The transverse cutters may be used only with the largest cutting angle of the cutter slide. Upon having ascertained this adjustment the right press rod bolt is turned by 180° so that the cutter slide goes down on the right side, and the pair of transverse cutters can take effect.

The eccentrical press rod bolt of the right cutter slide side must be dislocked prior to its adjustment. The adjustment of the bolt which is carried out by means of a spanner can be controlled according to 2 labels. Upon finished adjustment the bolt must be locked again.

The adjustment rail:

The eccentric bolt on the right adjustment rail serves for balancing inaccuracies appearing during the cutting operation. By turning the eccentric bolt the adjustment rail can be displaced ahead and back.

When cutting pieces exceeding 1 m in length the adjustment rail need not be removed. The buffer is turned back, and the adjustment rail tilted upwards and retained by 2 bolts.

Working Instructions

for Plate Cutters ST 10/2500

No. 927

ST 16/3150

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ST 25/3150

It is possible to adjust the adjustment rail in not parallel direction by loosening the coupling sleeve of the handwheel shaft, thus adjusting one rack only. When doing so, care should be taken of loosening the nut on the right side of the adjustment rail.

The finger guard:

The machine cannot be engaged unless the finger guard is tilted down. As soon as this device is tilted upward during the cutting operation the machine is automatically disengaged and the cutter slide stopped at once.

Safety device against overload:

The machine of type ST 10/2500 is equipped with a safety clutch arranged at the flywheel which is actuated as soon as the machine is overloaded. In case the clutch should slip during normal cutting the 4 springs of the safety clutch must be re-adjusted (detach the covering sheet!).

The machines of types ST 16/3150 and ST 25/3150 are furnished with a shearing pin arranged at the V-belt pulley of the flywheel. As soon as the pin is cut off the motor should be stopped at once. For installing a new pin (see page 13) the wheel guard must be detached. The strength of the shearing pin is to amount to 60 - 65 kgs/cm².

Lubrication:

All important parts of the machine are lubricated through high pressure lubricators. Their work is explained in the annexed instruction 182. When supplying the machine the feed to the individual greasing points is adjusted to maximum throughput and must be readjusted, after the machine has been set to service, under careful observation of the individual greasing points. The remaining greasing points to be lubricated by hand can be gathered from the annexed lubrication plan and lubrication instructions.

Control device

The electric-pneumatic, compressed air actuated control device is designed for hand and foot operation. For engaging the machine both the pressbutton arranged on the left side of the machine (coupling "on") and the pedal can be used.

The throw switch installed in the instrument panel arranged at the left side of the machine can be switched to the following positions:

Single motion; Continuous motion; Off.

Start of the machine:

Prior to setting the machine to service its mode of effect and operation should be learnt as well as the correct connection of the electric feeder checked. The V-belts (of types ST 16/3150 and ST 25/3150 only) should be examined as to their proper tension and flush.

Check the accordance of sense of rotation and speed of the flywheel to the indications marked on the machine body.

Working Instructions

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for Plate Cutters ST 10/2500

ST 16/3150

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ST 25/3150

Attendance of the machine:

According to its application the machine is subject to more or less heavy soiling. It is necessary, therefore, to keep the machine in proper condition, and that by removing the coarse soilings once a week at the least, and by cleaning it thoroughly every month.

Attendance of the drive:

The whole drive running in an oil bath practically does not require any attendance. The oil chamber of the gear box should be filled with acid-free, medium-bodied oil. For such purposes a mixture of equal parts of machine oil and cylinder oil will be suitable. The oil filling should be renewed after larger, periodical intervals and after the box has been scavenged with benzene or benzol. The oil level can be controlled through the oil glass arranged on the back of the machine. The antifriction bearings of the flywheel, furthermore, should be frequently listened to and their work checked.

Cutting line indicator:

The machine is equipped with three projectors. The emanating light ray throws a shadow edge on the sheet to be cut. Delineation and shadow edge should be brought into coincidence. The arrangement and adjustment of the light ray can be gathered from the annexed drawing of the cutting line indicator.

and is to be used as follows:

1. Projector	1. Projector
2. Projector	2. Projector
3. Projector	3. Projector
4. Projector	4. Projector
5. Projector	5. Projector
6. Projector	6. Projector
7. Projector	7. Projector
8. Projector	8. Projector
9. Projector	9. Projector
10. Projector	10. Projector
11. Projector	11. Projector
12. Projector	12. Projector
13. Projector	13. Projector
14. Projector	14. Projector
15. Projector	15. Projector
16. Projector	16. Projector
17. Projector	17. Projector
18. Projector	18. Projector
19. Projector	19. Projector
20. Projector	20. Projector
21. Projector	21. Projector
22. Projector	22. Projector
23. Projector	23. Projector
24. Projector	24. Projector
25. Projector	25. Projector
26. Projector	26. Projector
27. Projector	27. Projector
28. Projector	28. Projector
29. Projector	29. Projector
30. Projector	30. Projector
31. Projector	31. Projector
32. Projector	32. Projector
33. Projector	33. Projector
34. Projector	34. Projector
35. Projector	35. Projector
36. Projector	36. Projector
37. Projector	37. Projector
38. Projector	38. Projector
39. Projector	39. Projector
40. Projector	40. Projector
41. Projector	41. Projector
42. Projector	42. Projector
43. Projector	43. Projector
44. Projector	44. Projector
45. Projector	45. Projector
46. Projector	46. Projector
47. Projector	47. Projector
48. Projector	48. Projector
49. Projector	49. Projector
50. Projector	50. Projector
51. Projector	51. Projector
52. Projector	52. Projector
53. Projector	53. Projector
54. Projector	54. Projector
55. Projector	55. Projector
56. Projector	56. Projector
57. Projector	57. Projector
58. Projector	58. Projector
59. Projector	59. Projector
60. Projector	60. Projector
61. Projector	61. Projector
62. Projector	62. Projector
63. Projector	63. Projector
64. Projector	64. Projector
65. Projector	65. Projector
66. Projector	66. Projector
67. Projector	67. Projector
68. Projector	68. Projector
69. Projector	69. Projector
70. Projector	70. Projector
71. Projector	71. Projector
72. Projector	72. Projector
73. Projector	73. Projector
74. Projector	74. Projector
75. Projector	75. Projector
76. Projector	76. Projector
77. Projector	77. Projector
78. Projector	78. Projector
79. Projector	79. Projector
80. Projector	80. Projector
81. Projector	81. Projector
82. Projector	82. Projector
83. Projector	83. Projector
84. Projector	84. Projector
85. Projector	85. Projector
86. Projector	86. Projector
87. Projector	87. Projector
88. Projector	88. Projector
89. Projector	89. Projector
90. Projector	90. Projector
91. Projector	91. Projector
92. Projector	92. Projector
93. Projector	93. Projector
94. Projector	94. Projector
95. Projector	95. Projector
96. Projector	96. Projector
97. Projector	97. Projector
98. Projector	98. Projector
99. Projector	99. Projector
100. Projector	100. Projector

Claw Coupling
controlled electric-pneumatically

No. 927/a

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Automatic feed of oil

Greasing holes

In compressed air

Connection of
compressed air

Reversal of oil

Parts of the coupling

- | | |
|-------------------|---------------------|
| 1 Eccentric wheel | 12 Brake lining |
| 2 Claw ring | 13 Safety bolt |
| 3 Eccenter shaft | 14 Pressing spring |
| 4 Clutch carrier | 15 Cap |
| 5 Fitting disk | 16 Sealing screw |
| 6 Claw shifter | 17 Cover |
| 7 Claw ring | 18 Control cylinder |
| 8 Braking ring | 19 Piston |
| 9 Pressing spring | 20 Cover |
| 10 Brake drum | 21 Control valve |
| 11 Brake sheet | 22 Simmerring |

b7E .00

Description of the claw coupling

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8 page

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The claw coupling is combined with a disk brake; both are actuated electric-pneumatically. By actuating the pedal or press button the control valve (21) is opened through a lifting magnet, and the way given free for the coupling air. The coupling air presses ahead the piston (19) which engages the two claw rings (2) and (7) through a braking ring (8) and a claw shifter (6). After the turn of the eccentric shaft is finished the circuit within the control valve (21) is interrupted through a limit switch. The coupling air may elapse, and the always acting braking air of lower pressure presses the piston (19) back again. In this way the braking ring (8) is pressed against the brake linings (12), thus braking the eccentric shaft (3). A safety device, consisting of the safety bolt (13), spring (14), and cap (15) retains the eccentric shaft (3) in its position after the compressed air has been stopped.

The air pressure within the coupling can be controlled by means of a reducing valve. Its normal value amounts to $p = 4$ atm. above atmospheric pressure.

For replacing the brake linings (12) the control cylinder (18) must be screwed off and detached together with the piston (19). Then the brake sheet (11) is removed, and the new brake linings are rivetted on.

The claws are automatically lubricated. The oil is collected, by means of a greasing tube, in the gear box and supplied to the claws. An opening arranged in the lower part of the casing permits the oil to flow back. The slide faces of the coupling should be greased once a week, and that through the greasing holes provided in the claw shifter. In order to maintain the braking effect, the brake linings of the brake must not receive any oil.

14A, 14B, 14C

3000 W

14A, 14B, 14C

281910 RM-141

25 A

6 A

25 A

14A, 14B, 14C

3 x 60 A

50000 Ohms

14A, 14B, 14C

0.1 A

Limiting line indicator

2. Large sockets

1. 110 switch, on + off

Accessories:

1. 110 element, complete

1. 110 element, complete

1. Ring head

1. 110 element, complete

1. 110 switch

1. 110 element

2. 110 element, 110 element

2. 110 element

List on Electric Parts ST 10/2500/630

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Designation: Type: Supplier:

Main drive:

- 1 DK motor, B 5, 13 KW, 17.8 HP, 220/380 V, 1438 rpm, 45/26 A, 65564 Grunhein/Sa.
- 1 Air contactor with motor protection, control voltage 220 V, 25-40 A, 75
- working voltage 380 V

- 3 1-pole fuse elements, complete 60 A

- 5 Delay action cartridges 60 A

- 2 Single push button insertions Pl.No. 269200 AT

Control of coupling:

- 1 Coil for the control valve 1KA, Oppach

- 1 Air contactor 1A, 10 AT

- 1 Auxiliary relay RH 91 AT

- 1 Rectifier 202/42 RT, Grobräschen

- 1 1-pole fuse link, complete 25 A

- 1 Delay action cartridge 6 A

- 2 Limit switches with pin 1 and 2 Bonstein

- 2 Limit switches with roller 5-5752 1KA, Rochlitz

- 2 Single push button insertions Pl.No. 269200 AT

- 1 Pile switch single - continuous Pl.No. 281910 1KA,

- single motion 1 off EX-017093 1KA, Annaberg

- 1 Signal lamp, complete AT

Cutting line indicator:

- 2 Flange sockets 8300 F 1KA, Ruhla

- 1 Pile switch, on & off 281910 EM-1/1 1KA, Annaberg

Miscellaneous:

- 1 Fuse element, complete 25 A

- 1 Delay action cartridge 6 A

- 1 Plug head 25 A

- 1 Signal lamp, complete Koch, Ilmenau

- 1 Knife switch 3 x 60 A

- 1 Resistance 50000 Ohms

- 2 Fine-wire fuse elements with screw cap

- 2 GS-fuse links 0.1 A

1/250 .00

Plate 10/250/030

No. 927/a

10/250

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List on Wear Parts

Pcs.	Designation	Group	Drawing No.
2	Bushes Reducing gear I	C 70x90 R=2 NN	146
2	Bushes Reducing gear II	C 90x110 R=2 NN	146
1	Bush, front side Eccenter shaft	5 ST 1269	S
1	Bush, rear side Eccenter shaft	5 ST 1270	S
1	Bush	C 140x100 R=7 WN	146
1	Bush	5 ST 1267	S
1	Bush for lever	C 70x12 WN	146
2	Bush for traction rod	C 70x75 WN	146
1	Bush	C 70x75 WN	146
1	Bush for press rod	C 70x75 WN	146
1	Bush	5 ST 1295	S
1	Bush	5 ST 1296	S
1	Bush	P 70x75 WN	146
1	Bush	P 80x75 WN	146
1	Bush for cutter slide	C 130x30 WN	146
1	Bush	C 120x30 WN	146
2	Bushes for angle lever	5 ST 1273	S
4	Bushes for press rod	C 70x75 WN	146
1	Bush	C 40x75 WN	146
2	Bushes for traction rod	C 40x75 WN	146
1	Bush	C 50x45 WN	146
1	Bush for roller lever	C 110x100 WN	146
1	Bush for roller	C 90x75 WN	146
1	Bush for control valve	C 50x30 WN	146
1	Bush in the body	5 ST 1315	S
1	Central greasing	A 25x30 WN	146
1	Control valve	Round rubber packing	1
1	Control valve	Round rubber packing	1
2	Single row rigid deep groove ball bearings	Greasing life	1
1	Eccenter shaft	6212 DIN 625	S
1	"	6314 DIN 625	S
1	"	6412 DIN 625	S
4	Rear stop	6006 x	1

ATC 2

Plate Cutter, Type ST 10/2500/630 R

No. 927/a

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List on Wear PartsATTENTION: NO FIELD

Pcs.	Designation	Group	Drawing No.	
24	Pressure springs	Flywheel shaft	426/2591	
24	Pressure spring	Coupling	21 3/4 30	
2	Pressure springs	Bottom knife holder	72 1/4 30	
2	Conical springs	Holding down device	72 1/4 30	
		- drive	17/2952	
1	Pressure spring	"	76 3/4 30	
2	Tension springs	Engagement	326/1783	
1	Pressure spring	Rear stop	237/1782	
1	Pressure spring	Coupling	243/1782	
1	Guide rule	Cutter slide guide	5 3/4 1138	
2	Guide rules	"	5 3/4 1139	
1	Felt ring	Flywheel shaft	200 3/4 5404	
1	Slimmerring	Flywheel shaft	70/90 1/2 12	
2	Grooved ring sleeves	Coupling	55/125 1/2 x 15	
1	Grooved ring sleeve	Control valve	32/16 1/2 x 8	
2	Grooved ring sleeves	Balancing device	35/25 1/2 x 10	
2	Grooved ring sleeves	"	110/80 1/2 x 15	
8	Coupling linings	Flywheel shaft	3" 80 3/4 1113	
4	Brake linings	Coupling	3" 200 3/4 1113	
28	Tube rivets	Flywheel shaft	5 1/2 x 9.5 x 28 D17 7340	
28	Tube rivets	Coupling	6 1/2 x 9.5 x 16 D17 7340	
1	Round rubber packing	Coupling	6 1/2 x 155 average	
1	Round rubber packing	Control valve	6 1/2 x 25	
1	Round rubber packing	Control valve	6 1/2 x 40	
1	Metal hose	Greasing line	4 1/2 3/4 28	
4	Metal hoses	"	4 1/2 3/4 28	
2	Metal hoses	"	560 3/4 28	
1	Metal hose	Compressed air line	1/2" 350 long	
1	Metal hose	"	1/2" 650 long	

List of Material

ST 1001

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for the summary drawing 1 ST 1001

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ST 10/2500

Pos.	Designation and note	Part	Drawing No.	Material
1	Body	1	1 ST 1009	Steel
1	Flywheel shaft	2	4 ST 1126	Steel
1	Flywheel	3	3 ST 1125	Steel
4	Threaded bolts	4	5 ST 1132	Steel
1	Press ring	5	4 ST 1130	Steel
4	Pressure springs	6	426/2591	Steel
4	Spring plates	7	5 ST 1133	Steel
1	Coupling ring	8	4 ST 1129	Steel
8	Segments	9	B 80 WN 1113	Juride
1	Pinion $\pi = 6, z = 12$	10	3 ST 1128	Steel
2	Single row rigid deep groove ball journal bearings	11	6212 DIN 625	Steel
1	Cover	12	4 ST 1130	Steel
1	Packing ring	13	5 ST 1142	Cardboard
1	Distance ring	14	5 ST 1160	Steel
1	Distance ring	15	5 ST 1127	Steel
1	Single row rigid deep groove ball journal bearings	16	6314 DIN 625	Steel
1	Cover	17	4 ST 1164	Steel
1	Simmering	18	70/90 Ø x 13	Rubber
1	Bolt	19	4 ST 1120	Steel
1	Pinion $\pi = 8, z = 16$	20	4 ST 1121	Steel
2	Bushes	21	C 70 Ø x 90 WN 146	Steel
1	Geared wheel $\pi = 6, z = 18$	22	4 ST 1123	Steel
1	Cover	23	5 ST 1124	Steel
1	Packing cover	24	5 ST 1131	Steel
1	Bolt	25	4 ST 1116	Steel
1	Pinion $\pi = 11, z = 15$	26	4 ST 1117	Steel
2	Bushes	27	C 90 Ø x 110 WN 146	Steel
1	Geared wheel $\pi = 8, z = 16$	28	4 ST 1118	Steel
1	Distance bush	29	5 ST 1122	Steel
1	Cover	30	5 ST 1119	Steel
1	Packing cover	31	5 ST 1145	Steel
2	Special screws	32	5 SZ 374	Steel
1	Eccenter shaft	33	3 ST 1109	Steel
1	Front bush	34	5 ST 1269	Steel
1	Rear bush	35	5 ST 1270	Steel
1	Pinion $\pi = 11, z = 15$	36	3 ST 1287	Steel
1	Bush	37	5 ST 1267	Steel
1	Bush	38	3 ST 1113	Steel
1	Claw ring	39	5 ST 1333	Steel
1	Distance ring	40	3 ST 1114	Steel
1	Claw shifter	41	3 ST 1115	Steel
1	Claw ring	42	4 SZ 257	Steel
1	Coupling carrier	43	5 ST 1360	Steel
1	End disk	44	3 ST 1352	Steel
1	Brake drum	45	B 200 WN 1113	Juride
4	Brake linings	46	4 ST 1350	Steel
1	Brake	47		

List of Material

4 ST 1362

For the summary drawing 1 ST 1001 01
ST 10/2500 V1 TC

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Pcs.	Designation and note	Part	Drawing No.	Material
1	Pressure spring	49	21 WN 30	ST 42.21
1	Grass sheet	50	3 ST 1356	ST 42.21
1	Control cylinder	51	3 ST 1146	ST 42.21
1	Cover	52	3 ST 1147	ST 42.21
1	Round rubber packing	53	6 Ø x 115	ST 42.21
1	Piston	54	5 ST 1148	ST 60
1	Sliding ring	55	5 ST 1357	ST 42.21
2	Grooved rings 135/125 Ø x 15, resp. 120/100 Ø x 10	56	4 ST 1330	ST 42.21
1	Cap	57	4 ST 1330	ST 42.21
1	Safety bolt	58	5 ST 1329	ST 60
1	Screw spring	59	243/1782	ST 42.21
1	C-lever, to the left side	60	3 ST 1029	ST 42.21
1	C-lever, to the right side	61	3 ST 1028	ST 42.21
2	Bushes for C-levers	62	5 ST 1271	ST 42.21
2	Bushes	63	Ø 110 / x 42	ST 42.21
2	C-lever bolts	64	3 ST 1186	ST 60
2	Wear and disks	65	5 ST 1187	ST 42.21
2	Front end-disks	66	5 ST 1188	ST 42.21
1	Tension rod	67	4 ST 1034	ST 42.21
1	Bush	68	Ø 140 / x 62	ST 42.21
2	Bushes	69	Ø 70 / x 75	ST 42.21
1	Press rod	70	4 ST 1178	ST 42.21
1	Bush	71	5 ST 1295	ST 42.21
1	Bush	72	5 ST 1296	ST 42.21
2	Bolts	73	5 ST 1189	ST 60
1	Bolt for C-lever	74	5 ST 1037	ST 60
1	Bolt for outer slide	75	5 ST 1190	ST 60
1	Slide disk	76	5 ST 1191	ST 42.21
1	Sliding disk	77	5 ST 1344	ST 37.12
1	Pressure spindle	78	4 ST 1122	ST 60
1	End disk for eccentric shaft	79	5 ST 1265	ST 42.21
1	Bolt for press rod	80	5 ST 1193	ST 60
1	Cover	81	5 ST 1184	ST 42.21
1	Press rod	82	5 ST 1197	ST 42.21
1	Bush	83	Ø 70 / x 75	ST 42.21
1	Bush	84	Ø 80 / x 75	ST 42.21
1	Eccentric bolt	85	4 ST 1198	ST 60
1	Lock	86	5 ST 1199	ST 42.21
1	Outer slide	87	1 ST 1094	ST 42.21
1	Bush	88	Ø 130 / x 30	ST 42.21
1	Bush	89	Ø 120 / x 30	ST 42.21
1	Guide cover to the left side	90	3 ST 1155	ST 42.21
1	Guide cover to the right side	91	3 ST 1159	ST 42.21
1	Left guide rule	92	4 ST 1137/1	ST 42.21
1	Right guide rule	93	4 ST 1137/2	ST 42.21
1	Slide log	94	4 ST 1153	ST 42.21
1	Bolt	95	5 ST 1216	ST 60
1	Guide rule	96	5 ST 1138	ST 42.21
2	Guide rules	97	5 ST 1139	ST 42.21
1	Bottom cutter holder	98	2 ST 1178	ST 42.21
2	Bolts	99	5 ST 426	ST 37.12
2	Wear rings	100	72 WN 30	ST 42.21
1	Bolt	101	5 ST 1222	ST 60

List of Materialfor the summary drawing of 1001
ST 10/2500

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Pos.	Designation and Note	Part on Drawing No.	Material
1	Bolt	102 5 ST 1021	St 60
2	Adjusting screws	103 5 ST 1022	St 60
1	Holding down device	104 3 ST 1011	
1	Left cover for the holding down device	105 4 ST 1156/1	St 22
1	Right cover	106 4 ST 1156/2	St 22
2	Angle levers	107 3 ST 1231	St 60
2	Bushes	108 5 ST 1273	Rg 9
4	Bushes	109 C 70 ϕ x20 WN 146	Rg 9
2	Bolts	110 5 ST 1215	St 60
2	Threaded rods	111 5 ST 1219	St 50
2	Conical springs	112 17/2952	St.
2	Disks	113 B 60x35x16 WN 126	St 37.12
4	Disks	114 B 60x35x36 WN 126	St 37.12
2	Bolts for the angle lever	115 5 ST 1218	St 60
5	Safety disks	116 5 ST 1251	St 37.12
1	Press rod	117 4 ST 1036	St 60
2	Bushes	118 C 40 ϕ x75 WN 146	Rg 9
2	Bushes	119 C 50 ϕ x25 WN 146	Rg 9
1	Tension rod	120 4 ST 1035	St 60
1	Bush	121 C 50 ϕ x45 WN 146	Rg 9
1	Roller lever	122 3 ST 1230	St 60
1	Bush	123 C 110 ϕ x100 WN 146	Rg 9
1	Bush	124 C 90 ϕ x130 WN 146	Rg 9
1	Bolt	125 5 ST 1217	St 60
1	Bolt for the roller	126 5 ST 1207	St 60
1	Roller	127 5 ST 1208	St 60
1	Bush	128 C 50 ϕ x30 WN 146	Rg 9
1	Bolt for the roller lever	129 4 ST 1200	St 60
1	End disk	130 5 ST 1206	St 42.21
1	Range bush	131 5 ST 1078	St 42.21
1	Spring rod	132 5 ST 1220	St 60
1	Bolt	133 5 ST 1223	St 60
1	Pressure spring	134 76 WN 30	St.
1	Spring plate	135 5 ST 1224	St 42.21
1	Cam plate	136 5 ST 1265	St 60.21
1	Cam for the limit switch	137 5 ST 1243	St 42.21
1	Pedal lever	138 3 ST 1023	St 60
2	Bolts	139 5 ST 1027	St 37.12
2	Tension springs	140 1783/326	St.
1	Adjusting plate for the limit switch	141 5 ST 1347	St 42.21
1	Control valve	142 3 ST 1006	St 60
2	Balancing air cylinders	143 3 ST 1039	St 60
2	Covers hereto	144 5 ST 1042	St 42.21
2	Grooved ring sleeves	145 45/25 ϕ x 10	Rubber
2	Piston rods	146 4 ST 1044	St 60
2	Pistons	147 5 ST 1041	St 22
2	Sleeve holders	148 5 ST 1043	St 42.21
2	Grooved ring sleeves	149 110/80 ϕ x 15	Rubber
2	Bolts	150 5 ST 1252	St 60
2	Seather disks	151 20 WN 5410	Leather
2	Bolts	152 5 ST 1017	St 42 K

List of material
for the summary drawing 1001
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Pos.	Designation and notes	Part No.	Drawing No.	Material
1	Lever	154	5 ST 1228	St 42.21
1	Shaft	155	5 ST 1229	St 37.12
1	Bush	156	4 25 230 42 146	St 9
1	Coupling	157	5 ST 1361	St 60
1	Hallup-lubricator	158	5 16	St 60
1	Covering hood	159	1 ST 1297	St 60
1	Finger guard	160	3 ST 1334	St 60
1	Left angle	161	4 ST 1338/1	St 42.21
1	Right angle	162	4 ST 1338/2	St 42.21
1	Retaining angle, left	163	4 ST 1348	St 60
1	Retaining angle, right	164	4 ST 1349	St 60
7	Shearing cutters	165	4 ST 1016	St 67
1	Shearing cutter	166	4 ST 1254	St 60
1	Journal spring	167	5 ST 1253	St 60
1	Cutting line indicator	168	2 ST 1085	St 60
1	Adjusting rail	169	5 ST 1177	St 100.12
2	Rests	170	4 ST 1189	St 60
1	Eccentric bolt	171	4 ST 1183	St 60
1	Sliding bolt	172	4 ST 1184	St 60
2	Bolts	173	20 h 8x60 DIN 1433	St 60
1	Left rack	174	3 ST 1232/1	St 60
1	Right rack	175	3 ST 1232/2	St 60
1	Gauge	176	5 ST 1243	St 60
1	Shaft for the stop	177	4 ST 1169	St 60
2	Pedestals	178	3 ST 1165	St 22
2	Journal screws	179	5 ST 386	St 60
2	T-handles	180	5 ST 1176	St 42 K
2	Bolts	181	5 ST 388	St 60
2	Plates	183	5 ST 1167	St 42.21
2	Ball handles	182	50 h 89	St 42.21
2	Bearings	184	5 ST 1166	St 22
1	Adjusting ring	185	5 ST 1168	St 37.12
2	Pinion shafts	186	4 ST 1174	St 60
1	Single row rigid deep groove ball journal bearings	187	6006 DIN 625	St 60
2	Covers	188	4 ST 253	St 37.12
2	Covers	189	4 ST 254	St 37.12
1	Handwheel shaft	190	5 ST 1175	St 50
1	Handwheel	191	4 ST 255	St 18
1	Sleeve	192	4 ST 266	St 45
1	Driving lever	193	3 ST 1235	St 60
1	Bolt for the roller	194	5 ST 1237	St 60
1	Roller	195	5 ST 1239	St 81
1	Dog on the cutter slide	196	5 ST 1242	St 50
1	Split head	197	5 ST 1245	St 60
1	Bolt without head	198	20 h 8x70x58	St 60
1	Rod	199	M 20 x 330 DIN 1433	St 60
1	Pressure spring	200	237/1782	St 60
1	Top spring plate	201	5 ST 1249	St 42.21
1	Bottom spring plate	202	5 ST 1250	St 42.21
1	Adjusting rail	203	4 ST 1325	St 42.21

List of Material

for the summary drawing 1 ST 1001
ST 10/2500

4 ST 1362

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Qcs.	Designation and note	Part	Drawing No.	Material
1	Stop rule	204	5 ST 1047	St 42.21
1	Slide	205	4 SZ 432	St42.21
1	Link	206	5 SZ 433	St42.21
1	Bolt	207	5 SZ 434	St42.21
1	Gauge	208	W 9723	Ms
2	Rests	209	4 ST 1132	
1	Front adjusting rail	210	5 SZ 389	St42.21
1	holder of the lower transverse			
	cutter	211	4 ST 1093	St 50
1	Washer	212	5 f 4530	St 60
1	Lower transverse cutter	213	4 ST 1289	67 Si
				Cr 5
1	Upper transverse cutter	214	4 ST 1158	-"
1	Limiting strip	215	4 ST 1372	St 42.21
1	Simmerring	216	320/300 Ø x 20	

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